

REMARKS/ARGUMENTS

Claims 1-10 and new Claims 11-12 are active in the case. Reconsideration is respectfully requested.

The present invention relates to a process for preparing low-odor addition polymers from acrylic acid monomer.

Claim Objections

The claims have been amended with a view to obviating the language in the claims that is believed to be objectionable. Other amendments have been made to the claims in order to clarify the language of the claims. Withdrawal of the objection is respectfully requested.

Invention

The present invention is directed to a process for preparing a low-odor hydrogel-forming acrylic acid polymer, by (a) preparing a polymeric hydrogel by free-radically polymerizing a monomer composition comprising at least 50 % by weight of acrylic acid that contains volatile saturated carboxylic acid impurity, specifically acetic acid, propionic acid or combinations thereof in a total amount of less than 400 ppm, by weight, based on the amount of acrylic acid, in an aqueous polymerization medium and converting said hydrogel into a particulate hydrogel or into hydrogel-forming powder; and optionally (b) treating the particulate hydrogel or said hydrogel-forming powder with a crosslinking substance which, actually or latently, contains at least two functional groups that are capable of reacting with the carboxyl groups on the addition polymer.

Claim Rejection, 35 USC 102

Claims 1 and 4-19 stand rejected based on 35 USC 102(e) as anticipated by Irie et al, U. s. Patent 6,388,000. This ground of rejection is respectfully traversed.

The Irie et al patent is clearly relevant to the present invention because it discloses an absorbent acrylic acid polymer material that is formed by the polymerization of an acrylate monomer in an aqueous medium. An essential requirement of the method disclosed is that the acrylate starting monomer must contain not more than 1,000 ppm of β -hydroxy propionic acid as an impurity so that a product is obtained that exhibits virtually no increase in residual monomer content under varying conditions. The patent states that what is meant by the term “acrylate” starting monomer material is the total of un-neutralized acrylic acid and neutralized acrylic acid in the starting material for the polymerization reaction.

The Examiner contends that the patent discloses the process of the present invention, because it discloses the polymerization of acrylic acid starting material in an aqueous medium that contains not more than 1,000 ppm of β -hydroxy propionic acid as an impurity (see Summary of the Invention). However, this is not the process of the present invention as claimed. The objective of the present invention is the preparation of a polymerized acrylic acid material which, besides the objective of being an absorbent of water, is a polymer product that is characterized by having a low level of odor. As stated on pages 1 and 2 of the specification, the finding of the present invention is that specifically the two low molecular weight acids, acetic acid and propionic acid, contribute significantly to the odor of polymerized acrylic acid, which is especially undesirable when the polymerized product, as an absorbent hydrogel, is to be used in the manufacture of hygienic articles. This unpleasant odor, however, can only be noticed and thus is particularly acute, when the super-absorbent polymer has been subjected to a surface post crosslinking substance that contains at least two functional groups capable of reacting with the carboxyl groups of the polymerized acrylic

acid (see page 2, lines 25 to 31). Neither propionic acid nor acetic acid themselves contribute to the unpleasant odor, but only their reaction products. This finding required a significant amount of research to establish. Accordingly, the absorbent polyacrylic acid product obtained has a very desirable low odor. This fact is shown by the data in the table on page 23 of the text. It is therefore clear that the failure of the Irie et al patent to show or suggest either acetic acid or propionic acid or both as the odor causing impurity in a polyacrylic acid product, but instead only teaches that β -hydroxy propionic acid is the impurity in acrylic acid, establishes that the patent fails to anticipate the present invention as claimed. Simply stated, β -hydroxy propionic acid is neither acetic acid nor propionic acid. Withdrawal of the anticipatory ground of rejection is respectfully requested.

Claims 2 and 3 stand rejected based on 35 USC 103(1) as obvious over Saxer et al (apparently Irie et al, U. S. Patent 6,388,000 is intended) in view of Saxer et al, U. S. Patent 5,504,247. This ground of rejection is respectfully traversed.

Claims 2 and 3, as dependent claims, are dependent on Claim 1 which has been shown above to not anticipate the present invention as claimed. Since the two dependent claims fully incorporate the subject matter of Claim 1 therein, they are also not anticipated or obviated by Irie et al. Moreover, although Saxer et al discloses a method of purification of acrylic acid by fractional crystallization, there is no teaching or suggestion of a purified acrylic acid material that contains less than a certain maximum amount of acetic acid and/or propionic acid and is therefore especially useful in the preparation of a polymerized acrylic acid product that has an especially low odor. Accordingly, withdrawal of the obviousness ground of rejection is respectfully requested.

Applicants do not concur with the Examiner's conclusion that one of skill in the art would be led by Saxer et al, in view of Irie et al, to prepare a super absorbent polyacrylic acid product, because there is no recognition in either reference that an acrylic acid starting

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material for polymerization, that has a specified low acetic acid and propionic acid content, solves the specific problem of odor content of polymerized acrylic acid hydrogel.

It is now believed that the application is in proper condition for allowance. Early notice to this effect is earnestly solicited.

Respectfully submitted,

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